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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/584,712

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EXAMINER

PATEL, DEVANG R

ART UNIT

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1793

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02/03/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/584,712	Applicant(s) KAWAGOE ET AL.	
	Examiner DEVANG PATEL	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. **Claims 1-4** are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-022188 A (JP'188, of record) in view of Kannegiesser et al. (US 6309506, US '506, of record), Toyama (JP 11278626 A, of record), and further in view of Garbini et al. (US 3883386, of record).

a. **Regarding claim 1, JP'188** discloses a production method for a solar battery module comprising the steps of:

- i. utilizing a production apparatus (fig. 1) including a conveyance mechanism (equivalent to positioning belt) for placing cell c having an interconnect, onto the supply stage 11 (¶ 29), a heating conveyor belt 90/91/92 (figs. 7-8), and a press belt 55 (having pressure bar 56) extending over the positioning conveyor and the heating belt in an opposed relation to the positioning conveyor and the heating belt. JP '188 does not disclose the heating belt (90/91/92) having any suction holes.
- ii. JP'188 does not disclose the press belt overlapping at least a portion of the positioning belt. However, **US '506** (drawn to conveyor apparatus for joining surface structures) discloses upper conveyor belt 31 (analogous to pressing belt) overlapping at least a portion of the lower conveyor belt 30 (analogous to positioning belt) (fig. 2, col. 4, lines 46-50).

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It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide overlapping arrangement similar to US '506 in the conveyor apparatus of JP '188 because doing so would have resulted in a smooth transition of the substrate being conveyed (photovoltaic cell from the supply stage to the connection stage).

iii. JP'188 does not disclose the positioning belt having a vacuum suction hole. However, such technique is well known in the art. **Toyama** is drawn to semiconductor wafer conveyor used for solar cell, integrated circuit manufacture (Derwent- Abstract). Toyama teaches that through-holes provided on the conveying belt keep the wafer (substrate) vacuum fixed, inhibits deviation of the substrate position and thus, the transfer operation of the substrate is performed efficiently (advantage). In view of that, it would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate vacuum holes similar to Toyama in the positioning belt of JP '188 because doing so would prevent deviation of the solar cells position during conveying and would result in efficient transfer operation (Toyama).

iv. It is unclear whether the apparatus of JP'188 is adapted to control the heating belt and the press belt at predetermined temperatures. Garbini et al. (hereafter **Garbini**) is drawn to a continuous conveyor apparatus for joining flat materials by heating under pressure. Garbini also discloses a positioning belt 4 for feeding the articles 5. Garbini discloses an upper

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heating conveyor belt 1 and a lower conveyor belt 3 (fig. 1); raising the temperature of the metal belt to the desired value (col. 1, line 50 thru col. 2, line 8). Garbini discloses a further embodiment wherein both continuous belts include heating means 2 (fig. 2; col. 2, lines 15-19). Thus, it is possible to control the heating belt and the press belt at predetermined temperatures (fig. 2). Moreover, the belts are lined with an anti-adhesive material in order to avoid any adhesion between the treated parts and belts themselves (col. 2, lines 9-15). It would have been obvious to a person of ordinary skill in the art to modify the conveyor apparatus of JP'188 by the conveyor belts of Garbini because doing so achieves a very fast and uniform heating of the whole belt and avoids adhesion between the workpiece and the belts (col. 1, line 66; col. 2, line 11). Additionally, an artisan would have been motivated to provide a pair of opposing heating and press belts as shown by Garbini in order to obtain more efficient and uniform joining of the workpieces (solar battery cells in this case) (col. 1, lines 39-49).

v. JP '188 discloses positioning a plurality of solar battery cells (c) and interconnectors (t) required for connection of the battery cells on an upstream portion of the positioning belt and transporting the solar battery cells and the interconnectors to a downstream portion of the positioning belt (¶ 15); JP '188 as modified by Toyama includes holding the solar cells

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and respective interconnectors in a proper position by the action of vacuum suction holes during conveying.

vi. JP '188 discloses transferring the solar battery cells and the interconnectors transported to the downstream portion of the positioning belt onto the heating belt while holding the solar battery cells and the interconnectors between the positioning belt and the press belt;

vii. JP '188 discloses holding the solar battery cells and the interconnectors transferred onto the heating belt between the heating belt and the press belt and soldering the interconnectors to the solar battery cells while transporting the solar battery cells and the interconnectors (claim 3).

b. **As to claim 2**, JP '188 as modified by Garbini includes lining the belt with fiberglass or Teflon, which is composed of resin.

c. **As to claim 3**, JP '188 discloses a positioning belt (conveyance mechanism - not shown) and a heating belt (10) located adjacent each other in a transferable manner (fig. 1); and a press belt 55 extending over the positioning belt and the heating belt in opposed relation to the positioning belt and the heating belt. JP '188 as modified by Toyama, US '506 and Garbini discloses that the heating belt and press belt are each controlled at a predetermined temperature, the press belt overlaps at least a portion of the positioning belt, the positioning belt has a vacuum suction hole, and the heating belt has no suction hole (see rejection in claim 1 above).

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- d. **As to claim 4**, JP '188 as modified by Garbini includes lining the belt with fiberglass or Teflon (col. 2, line 59), which is composed of resin.
2. **Claims 5-10** are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'188 in view of US '506, Toyama, and Garbini as applied to claims 1 and 3 above, and further in view of Focke et al. US 5674542, of record).

e. **As to claims 5 & 7**, none of the references in claim 1 above discloses at least one upper and lower resilient member to bias the heating belt and the press belt toward each other. However, **Focke** et al. discloses flexible leaf springs 35 which exert pressure on the upper conveyor belt 24 so that the upper conveyor 24 and the lower conveyor 23 are pressed together (fig. 1; claim 3). The claim would have been obvious because employing leaf springs similar to Focke in the upper and lower conveyor belts of JP' 188 would have yielded the predictable result of effectively pressing the conveyor belts together to one of ordinary skill in the art at the time of the invention. An artisan would have been motivated to incorporate such springs for pressing the belts in order to provide effective heating while conveying the solar cells.

f. **As to claims 6 and 8**, modified apparatus of JP'188 in view of Focke discloses at least one upper and lower leaf spring as explained in claim 5 above.

g. **As to claims 9-10**, the claims would have been obvious to an artisan at the time of the invention since providing a number of resilient members as claimed is merely a provision of adjustability, which involves only routine skill in

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the art. One would provide suitable upper and lower resilient members depending the desired pressing of the belts toward each other.

3. **Claims 11-12** are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'188 in view of US '506, Toyama, and Garbini as applied to claims 1 and 3 above, respectively, and further in view of Meyer (US 4997507, of record).

h. **As to claims 11-12**, JP '188 discloses upper heating blocks (80-82), but fails to disclose lower heating blocks or cooling blocks as claimed. However, **Meyer** (drawn to apparatus for bonding laminar workpieces, fig. 1) discloses upper heating blocks (42, 48), lower heating blocks (40, 46), and cooling blocks 70 (both upper & lower- col. 6, lines 36-46). Meyer also discloses that apparatus is not limited to the configuration of the two conveyor belt assemblies (14, 16), but, if desired, it may include only one conveyor belt assembly. In such a case, the lower conveyor belt (i.e. heating belt 18) would extend from the feed station through the delivery station, including the cooling zone. Similarly, the upper belt (press belt 20) would extend through the exit of the cooling zone (col. 8, lines 58-68). Such an arrangement would include upper and lower cooling blocks 70 as claimed. It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide heating and cooling zones similar to Meyer in the apparatus of JP'188 in order to regulate the temperature and uniformly and/or more rapidly heat or cool the workpieces (solar module in this case) passing therethrough (col. 6, lines 40-46).

Response to Arguments

Applicant's arguments filed 9/28/09 have been fully considered but they are not persuasive. Applicant argues that contrary to claimed heating belt having no suction hole, JP '188 discloses suction ports 40 in the conveyor 10 (fig. 2). Examiner appreciates that suction ports are present. However, Examiner submits that JP '188 also discloses another embodiment of the conveyor having two or more belts such as 90, 91 & 92 (figs. 7-8), wherein there are no suction hole and thus, JP '188 meets the claimed negative limitation. Examiner also notes that the gap between the separate belts is not equivalent to a hole.

Examiner contacted Mr. Hyung Sohn several times in order to expedite the prosecution, however, no response was received.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Claims 1-12 are rejected.

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the art would have reasonably understood from the texts. Only specific portions of the texts have been pointed out to emphasize certain aspects of the prior art, however, each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

Applicant is reminded to specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. 1.121; 37 C.F.R. Part 41.37; and MPEP 714.02.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVANG PATEL whose telephone number is (571)270-3636. The examiner can normally be reached on Monday thru Thursday, 8:00 am to 5:30 pm, EST..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devang Patel/
Examiner, Art Unit 1793

/Jessica L. Ward/
Supervisory Patent Examiner, Art Unit 1793